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ABSTRACT

A year long study used data collected from 3 teachers and 15 students (in the first, third, and sixth grades of a rural midwestern school) to illustrate the relationships between students' understandings, strategic actions, metacognitive awareness, motivation in reading, and teachers who embrace instructional complexities. The complexities involved: (1) instructional understandings that reflect the multiple, complex, interrelated outcomes of becoming literate; and (2) adaptive instructional actions designed to develop understandings of what reading is, what good readers do, how good readers feel, when good readers use their strategic knowledge, and how everything fits together. The three teachers and five students from the lowest achieving reading group in each class participated in the study. Measures were taken at pre-, mid- and post-year time points which assessed teacher instructional understandings and adaptive actions as well as student understandings about reading, strategic actions while reading, awareness of lesson content, and motivation. Results indicated ways to alter thinking and actions about the development of strategic readers, and imply that teachers should embrace the complexities of classroom reading instruction. Findings suggest that the tendency to simplify instructional content actually impedes learning when complex, multiple, interrelated outcomes are sought. (Three tables of data and 2 figures are included; 15 references are attached.) (PRA)

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EMBRACING THE INSTRUCTIONAL COMPLEXITIES OF READING INSTRUCTION

Laura R. Roehler

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Abstract

This paper uses data collected from three teachers and their students to illustrate the relationships between students' understandings, strategic actions, metacognitive awareness, motivation in reading, and teachers who embrace instructional complexities. The complexities appear to involve (a) instructional understandings that reflect the multiple, complex, interrelated outcomes of becoming literate; and (b) adaptive instructional actions designed to develop understandings of what reading is, what good readers do, how good readers feel, when good readers use their strategic knowledge, and how everything fits together. This paper suggests ways to alter our thinking and actions about the development of strategic readers, arguing that teachers should embrace the complexities of classroom reading instruction. The tendency to simplify instructional content, in fact, impedes learning when complex, multiple, interrelated outcomes are sought.

EMBRACING THE INSTRUCTIONAL COMPLEXITIES OF READING INSTRUCTION[1]

Laura R. Roehler[2]

Skills and strategies are often taught in reductionistic ways, where they are simplified for ease of learning. Gagné (1985), for instance, suggests three phases. In the first phase, students learn a declarative representation for each step in the procedure which often involves the memorization of rules. In the second phase, the learning moves from a step-by-step declarative understanding to a step-by-step performance based understanding. In the third phase, students are taught to combine the pieces together to create larger efficient-action sequences of declarative and procedural knowledge. Complex tasks are simplified, then the pieces are combined for application. The assumption that complex tasks like reading instruction should be initially simplified and later combined is deeply rooted in classroom practice.

Recently, researchers (e.g., Feltovich, Spiro, & Coulson, 1989) have called into question the reductionistic approach to instruction. The argument is that initially breaking the process into small units is detrimental when learning involves complex, multiple, interrelated goals. Rather than limiting knowledge to the simplification of declarative and procedural variables at the beginning of reading instruction and learning and then combining these strategies with content for later use, it may be better to start with the development of a

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[2]Laura R. Roehler, professor of teacher education at Michigan State University, is co-coordinator of the Responsive Elaboration in Reading Project.

vision for larger conceptual understandings about reading and how it fits into literacy and then move to sets of strategies developing not only declarative and procedural knowledge, but also situational and conditional knowledge. This developed knowledge about strategies then needs to be fitted into emerging conceptual frames of what reading is, when to use it, and why one should use it. The development of strategic understandings finally needs to be combined with multiple opportunities for using strategies in relevant situations where sense making is the goal. This type of approach embraces the complexities of classroom instruction; acknowledges the importance of the learners having conceptual frames from the beginning; builds on the wealth of classroom learning opportunities in cognitively, metacognitively, and motivationally sound ways; and advances the possibilities of students becoming enthusiastic strategic sense makers when they read.

Background

Interest in strategies and strategy instruction developed simultaneously in educational psychology and teacher education. In educational psychology, carefully crafted laboratory experiments, developed in the 1970s, led to an extensive knowledge base about what strategies are, when they should be used, why they should be used, and how strategies should be used. Knowledge about memory strategies, cognitive strategies, and metacognitive strategies soon promised a wealth of information for classroom teachers. In the 1980s, researchers moved into classroom settings and began to teach all types of strategy lessons to various grade levels, continuing the development of understandings about strategies. As the wealth of information about strategy instruction grew, a major problem emerged. When teachers were asked to do what the researchers did, they had more difficulties teaching strategies during

classroom instruction. This concern has led a number of researchers to rethink classroom strategy instruction.

During the same period in teacher education, naturalistic classroom studies were being conducted where the regular teachers, not researchers, taught strategies. The researchers worked with the teachers, helping them to develop expertise in strategic instruction (see Au & Kawakami, 1984; Duffy, Roehler, Sivan, Rackliffe, Book, Meloth, Vavrus, Wesselman, Putnam, & Bassiri, 1987; Palinscar & Brown, 1984; Paris, Cross, & Lipson, 1984; and Stevens, Madden, Slavin, & Farnish, 1987, as examples of classroom strategy instruction). For instance, Duffy, Roehler, and associates (Duffy et al., 1987) have been investigating classroom reading strategy instruction. This work began in the mid-1970s when process-product studies showed that the actions of teachers during instruction had a positive and significant effect on student achievement (Brophy & Good, 1986). Building on this research and the findings of information processing studies, they (Duffy et al., 1987) showed in naturalistic experimental studies taught by classroom teachers that explicitness in instruction had a significant and positive effect on students' awareness of the content covered in class and on the use of reading strategies that had been taught. In addition, strategy-instructed students were more likely than control students to have conceptual understandings that reading is a self-directed activity, that reading involves problem solving, that skills and rules aid comprehension, and that the purpose of reading involves the selection of strategies for appropriate use. These teachers created instructional opportunities where students developed reading understandings in ways that encouraged them to use strategies metacognitively when sense making was disrupted.

As the researchers conducting these studies continued to study lesson transcripts generated during the research, it became apparent that some teachers were using slightly different instructional actions with these affecting learning. Thus a correlational analysis of teacher statements during instruction revealed high correlations between teacher motivational statements (what a strategy is, how it is used, and when) and student achievement, thereby adding to the importance of teacher talk as a determinant of student learning (Sivan & Roehler, 1986). What students come to know, are aware of, and can talk about have strong relationships with instructional actions. Teachers can learn to engage in instructional talk about the cognitive and metacognitive processes of reading. When this occurs, students' performance improves.

While the results of the direct explanation studies were enlightening and useful, some perplexing problems about teachers becoming effective regarding reading strategies remained. For instance, as the lesson transcripts, the teacher interviews, and the student interviews were examined, it became apparent that some teachers had students who were becoming strategic as opposed to others who simply possessed a set of strategies. Strategic students were able to recognize that sense making had been disrupted, could select and apply appropriate strategies until sense making was regained, and then continue reading. Students who simply possessed a set of strategies could use them in isolated situations only. Drawing upon cognitive psychology studies and the naturalistic classroom studies, research was conducted where students were taught to connect conceptual understandings to strategic actions. When teachers taught lessons reflecting these connections, learning appeared to increase and students appeared to have broader conceptual understandings and be strategic in their approach to reading for sense making (Roehler, Duffy, &

Tiezzi, 1987). Explicit awareness of the complexities of strategic reading instruction seemed to make a difference.

These studies led to a current set of studies which explore the relationships among teacher thinking, teacher actions, and student outcomes. The particular study described in this paper examined how teachers develop strategic readers in terms of their understandings, actions, awareness of lesson content, and motivation for reading. The measure of success for the teachers in this study was whether the students moved toward literacy in terms of developing (a) conceptual understandings about reading, (b) strategic actions of reading, (c) awareness of strategic actions in reading, and (d) motivation. Questions were developed regarding the manner in which reading instruction occurred and whether reading instruction that embraced the complexities of literacy acquisition was related to better student learning. The overall question was as follows. Do teachers whose instructional thinking and actions embrace the complexities of reading instruction have more impact on learning as their students move toward expertise in strategic reading than teachers who do not?

The specific questions that guided the study were as follows:

1. How did the teachers' instructional understandings about reading outcomes change over the year?
2. How did teachers' instructional actions for the reading outcomes change over the year?
3. How did students' understandings about strategic reading change over the year?
4. How did students' awareness of lesson content change over the year?
5. How did students' strategic actions for reading change over the year?
6. How did students' motivational attributions toward reading change over the year?

7. What is the relationship between teachers' instructional understandings and actions for reading and students' growth toward reading expertise?

Method

Participants

The participants for this study were 3 teachers selected from 18 teachers who participated with their principals in the first year of a five-year reading instructional study involving four rural school districts in the Midwest. The selected teachers included a first-grade teacher, a third-grade teacher, and a sixth-grade teacher from one school. Each teacher chose the lowest achieving reading group to participate in the study, and five of these low-group students were randomly selected to participate in this research.

Teacher A taught 24 first graders in a school where the principal and several other teachers participated in the study. She had 12 years of experience. Her September classroom environment included a blending of the basal reader approach and the literature-based approach. She was extremely interested in learning about the mental processes that helped her and her students to be strategic. She was well read in current research, having recently completed several reading methods courses at the master's degree level. Teacher A was highly motivated to learn how and when to employ empowered decision making that moved students toward literacy.

Teacher B taught 24 sixth graders in the same school. This was the first time she had taught at the sixth-grade level, although she had been teaching for a total of eight years. Teacher B was interested in incorporating strategies into her instructional program, but expressed concerns initially about her ability to do so since it was her first attempt at sixth grade. She cautiously moved into new types of instruction, simplifying the instructional

complexities by making certain she understood the new concepts before adding them to her instruction.

Teacher C, who had been teaching for 25 years, taught 27 third-grade students in the same school. She relied heavily on a basal text program, carefully following the teacher's guide, but expressed interest in learning to teach without a basal. She strongly believed in surrounding students with love and care, creating unusual and different ways to present basal text content when possible.

The principal for these three teachers had seven years of administration experience at the elementary level. He attended all sessions with the teachers, observed a reading lesson once a month for each teacher, and met with all participating teachers once a month to discuss reading issues and concerns.

Context of the Study

Certain instructional principles were built into this project. Of prime importance was the development of the understandings that reading instruction has multiple outcomes and teaching should involve opportunities for students to develop in all outcomes. Teachers were not expected to follow prescriptions faithfully. Instead, they were to be strategic by taking knowledge and flexibly adapting it to their situations. Teachers were to feel empowered about their reading instruction; they were to provide adaptive, adjusted, instructional actions. Teachers were to develop understandings about the importance of in-depth teaching of a few useful strategies embedded in a network of strategic thinking. Teachers were to understand the importance of teaching metacognitive awareness of mental processes being used during strategic actions. Teachers were to instruct in ways that enhanced motivation in terms of enthusiasm and efficacy for students. Finally, teachers were to

develop understandings about how and when to increase students' awareness and use of the mental processes that support strategic understandings and actions within meaningful and useful lessons that started with a vision and ended with that vision realized. These strategic mental processes were not to be taught separately, but integrated into sets of well-situated lessons using texts that have value for students.

What really counted for teachers who participated in the study was students' growth toward literacy in ways that increased their strategic actions, conceptual understandings about reading, metacognitive awareness of lesson content, and positive attitudes as reflected in measures of motivation. In order to help teachers instruct in this way, their principal became an instructional facilitator and created opportunities for collegial interactions with other teachers within the school. The principal's instructional role was critical for three reasons. First, he needed to support the professional growth efforts of these teachers. Second, teachers needed feedback from a significant peer about the appropriateness of their instructional understandings and actions on an immediate and ongoing basis. Third, when he participated in the development of the mental processes and shared language of these teachers and their students about literacy, the complexity of literary instruction and learning was better understood by all participants.

Thus, the principal was asked to show active support by participating in professional growth sessions that occurred throughout the year. In monthly observations, he provided feedback to teachers on effective lessons and helped the three teachers develop understandings about instruction through interactive reflection and participation designed to help students move toward literacy.

The second type of on-site support, collegial interactions, was created for all teachers by the principal. Because the three teachers in this study and two other teachers who also participated in the larger reading instructional study were from this school, they were able to develop further their understandings through scheduled and impromptu discussions. Developing understandings were explored, refined, and restructured through multiple collegial interactions throughout the school year. All three teachers participated equally in these experiences.

Measures, Data Collection, and Data Analysis Procedures

Measures for this study were taken at pre-, mid- and postyear time points. Each of the measures for teachers and then students is described. Analyses of these data are taken up as well.

The teacher instructional understandings measure. The measure of teacher instructional understandings examined thinking about the reading instructional outcomes of strategic processes, routine skills, positive responses, conceptual understandings, and content knowledge. Observers interviewed teachers at the beginning, middle, and end of the school year. Seven questions were asked. (a) What do you think reading is? (b) What is the role of literate activities in reading instruction? (c) What is the purpose (or goal) of the reading instruction you provide for your students? (d) What do you do to promote students' movement toward reading expertise? (e) What is the students' role in the development of reading expertise? (f) How do you assess your students' success in reading? Why do you assess in this way? (g) In your classroom, what kinds of things help your students become more literate? All three sets of interview responses were noted on protocols and audio taped for later

transcription. For this study, the base line and end-of-year interviews were used.

Raters determined which of the five outcomes were included in the teachers' responses. For each question, raters looked for evidence that teachers understood that reading involves gaining knowledge in (a) strategic processes, (b) routine skills, (c) positive attitudes, (d) conceptual understandings, and (e) content. The maximum obtainable score for each interview was 35, with each of the five outcomes potentially receiving a score of one for each of the seven questions.

Two raters, a researcher and a graduate student in teacher education, rated the lessons. When inter-rater reliability of .80 was reached and maintained, the ratings for instructional understandings were completed.

When rating transcripts, raters (a) independently read and rated all transcripts and recorded the scores; (b) conferred with each other, compared the various assigned ratings for instructional understandings, and reconciled any differences to arrive at scores for each protocol; and (c) submitted the jointly determined scores as final ratings.

After the protocols were rated, each teacher's pre- and postyear ratings were converted to percentages including the overall scores and each separate outcome score. Both types of converted scores were examined for evidence of growth.

The teacher adaptive actions measure. The adaptive action measure represented instances of transformed information. Transformed information was defined as information designed by the teacher to fit students' emerging levels of understanding. This instrument, used in an earlier study (Johnson & Roehler, 1989), was designed to examine teacher talk during reading lessons

that transformed reading knowledge in ways that helped students move toward literacy. The instrument was organized into a matrix with the types of knowledge--declarative, procedural, conditional, and situational--along the horizontal axis and outcomes of literacy instruction--content knowledge, routine skills, strategic processes, conceptual understandings, and positive attitudes--along the vertical axis. The matrix was used to determine the amounts and types of adaptive actions and the degree of metacognitive awareness of the adaptive actions.

Data were collected on an on-going basis throughout the school year. About every month, a researcher or principal observed a lesson, taking field notes and noting anomalies. Six reading lessons were transcribed for each teacher. For this study, two lessons were selected for the three teachers: the baseline lesson and an end-of-year lesson.

Data were analyzed in three ways. Amounts of adaptive actions were recorded by counting the instances of adaptive actions and the number of lines in each instance that was classified as adaptive. The noted adaptive actions segments were then placed in the matrix in terms of the five outcomes of reading instruction and the types of knowledge. Finally, each instance of adaptive actions was rated in terms of the development of metacognitive awareness on a scale of 0 to 4 with 0 being the absence of the criterion, 1 and 2 being the presence of awareness but the absence of metacognition, 3 being the presence of metacognitive awareness, and 4 being an exemplary instance of metacognitive awareness.

Two raters were trained to score typed transcripts of the lessons using the matrix format for amounts, types, and awareness of the adaptive actions. The raters were a researcher and a graduate student in the College of Education at

Michigan State University. When an inter-rater reliability of .80 was reached and maintained, the ratings for adaptive actions were completed following the format established with the instructional understandings interview.

After adaptive actions were rated, the amount of adaptive actions designated by lines of lesson transcripts were converted to percentages in order to examine growth through the year. Also, types of adaptive actions were examined in terms of the five outcomes to see if the types of lessons broadened over the year. Finally, quality of adaptive actions were converted to percentages to explore growth in metacognitive awareness over the year.

The student reading understandings measure. The student reading understandings interview, similar to the teacher understandings interview, measured students' thinking about the reading outcomes of strategic processes, routine skills, positive attitudes, conceptual understandings, and content knowledge. Observers interviewed four or five target students from the low reading group of the three participating teachers at the beginning, middle, and end of the year. Four questions were asked: (a) What do you think reading is? (b) Think about a person you know who is a good reader: why do you think that person is a good reader? (c) What does this person do when s/he is reading? (d) What did this person have to learn to become a good reader? All interview responses were noted on protocols and audiotaped for later transcription. For this study, the baseline and end-of-year interviews were used.

Raters determined whether the five outcomes were included in the students' answers to the five questions. For each question, raters looked for evidence that reading involves (a) strategic processes, (b) routine skills, (c) positive attitudes, (d) conceptual understandings, and (e) content knowledge. The maximum obtainable score was 25 for each interview with each of the five

outcomes potentially receiving a score of one for each of the five questions. Two raters, having established inter-rater reliability of .80, scored each student's answers.

After student protocols were rated, each student's pre- and postyear ratings were converted to percentages, including the overall scores and each separate score. Both types of converted scores were examined for evidence of growth.

The student awareness measure. To determine whether students were consciously aware of what the teacher taught in individual lessons (declarative knowledge), when to use it (conditional knowledge), and how to use it (procedural knowledge) (Paris et al., 1984), observers (principals or researchers) individually interviewed four or five target students immediately following observed lessons in an ongoing manner throughout the year. The observer interviewed students separately in the hallway or a conference room. All students were asked three questions: (a) What were you learning in the lesson I just saw? (b) When would you use what the teacher was teaching you? (c) How do you do what you were taught to do? Probing, follow-up questions were used with all students. All interview responses were noted on protocols and audiotaped. Interviews were transcribed for analysis. The baseline and end-of-year interviews were selected for this study.

Lesson interviews were rated using an instrument developed previously (Duffy et al., 1987). Scores were assigned for students' verbal statements about (a) what strategy was taught, (b) the situation or conditions when the strategy should be used, and (c) how one employs the strategy. Students received a rating of 0 to 4 for each of the three questions with a score of 0

being an absence of awareness and a score of 4 being exemplary metacognitive awareness. The highest possible score was 12 for each student.

Two researchers scored the typed transcript with the same procedures as those described for the teachers' understandings interviews. Inter-rater reliability was .80. After the awareness protocols were rated, the scores were converted to percentages in order to examine growth over the year.

The student strategic actions measure. Student strategic actions while reading were measured using a modified graded oral reading paragraph (GORP) technique adapted from the Qualitative Reading Inventory (Leslie & Caldwell, 1989). The modified GORP examined the students' ability to (a) predict the content of the passage and explain the reasoning for that process, (b) self correct reading errors and explain the reasoning for the self corrections, and (c) increase content knowledge about concepts developed in the passage and explain the reasoning used to gain that new knowledge. Passages for the oral readings were selected from Leslie and Caldwell's assessment device (1989), with two university professors trained as researchers. In September and again in May, they administered the 30-minute test individually to each of the randomly-selected, low-reading-group, target students. Each student's performance was tape recorded and noted on protocols.

Each testing session proceeded as follows. A preliminary test of sight word recognition involving 20 words for each grade level (provided by the Leslie and Caldwell device) preceded the actual reading of the passage and served as a determiner of the level of the passage to be read. Passages that were difficult were selected so students would have greater opportunities to be strategic as they read. The researcher showed the title of the passage to each student and asked for predictions about the selection's content and then the

reasoning for the prediction. Following predictions, the student was asked to give a definition for three to five concepts that would be developed in the passage. The lowest rated concepts were noted for examination after the passage had been read. The student read the passage aloud as the researcher noted all self corrections. After the passage was read, the researcher asked the student to answer six to eight questions designed to measure explicitly and implicitly gained knowledge. Then the student was asked to verify the accuracy of the prediction and the reasoning involved with the prediction. After predictions were explained, the student was asked to provide additional meanings for the lowest rated, prereading concept explanation and the reasoning for changes in the meaning. Finally, the researcher elicited the student's self-report about self-correction while reading. The researcher asked each student about the self-corrections noted during the oral reading and how it was accomplished. Two self-correction explanations were asked for each student. The highest scored response was used for the study.

Using audiotapes and written protocols completed during testing, two researchers noted the presence or absence of metacognitive awareness for this pre- and postyear measure regarding predictions, development of concept understanding through content knowledge acquisition, and self-corrections. Using a 0 to 4 rating (with 0 being the absence of the criterion, 1 and 2 being the presence of awareness but the absence of metacognition, 3 being the presence of metacognitive awareness, and 4 being an exemplary instance of the metacognitive awareness criterion), researchers established and maintained a .80 inter-rater reliability while determining scores for strategic actions in the three categories. After the ratings were determined, the scores were converted to percentages in order to examine growth across the year.

The student motivation measure. Student motivation was measured using a pre- and postyear questionnaire designed to capture students' perceptions about their enthusiasm and efficacy in reading. This measure was adapted for this study from a measure used in the Raphael, Englert, and Anderson line of research (1987). Using a five-point Likert scale, students were asked to respond to 15 statements about enthusiasm and 20 statements about self-efficacy. Classroom teachers administered the motivation questionnaire in September and again in May to the low-reading group students. A total possible score was 175. Each student's protocol was scored, and percentages were established for both pretest and posttest measures. Changes in enthusiasm and efficacy were examined for growth.

Results

Results are organized by the research questions. First, the two questions about teacher understandings and actions are addressed. Then, the four questions about student understandings about reading, strategic actions, awareness of lesson content, and motivation are addressed.

Evidence of Change in Teacher Instructional Understandings

The instructional understandings interview which assessed knowledge about the five outcomes yielded scores that showed varying amounts of increase for each of the three teachers.

Teacher A started with a score of 15 out of 35 (43%) and ended the school year with a score of 28 out of 35 (80%), for a growth of 86% in instructional understandings about the outcomes of reading (see Figure 1). Within both time points, the specific outcome measures of strategic processes, routine skills, positive responses, conceptual understandings, and content knowledge showed reconfigurations of amounts of understandings. Strategic processes received a

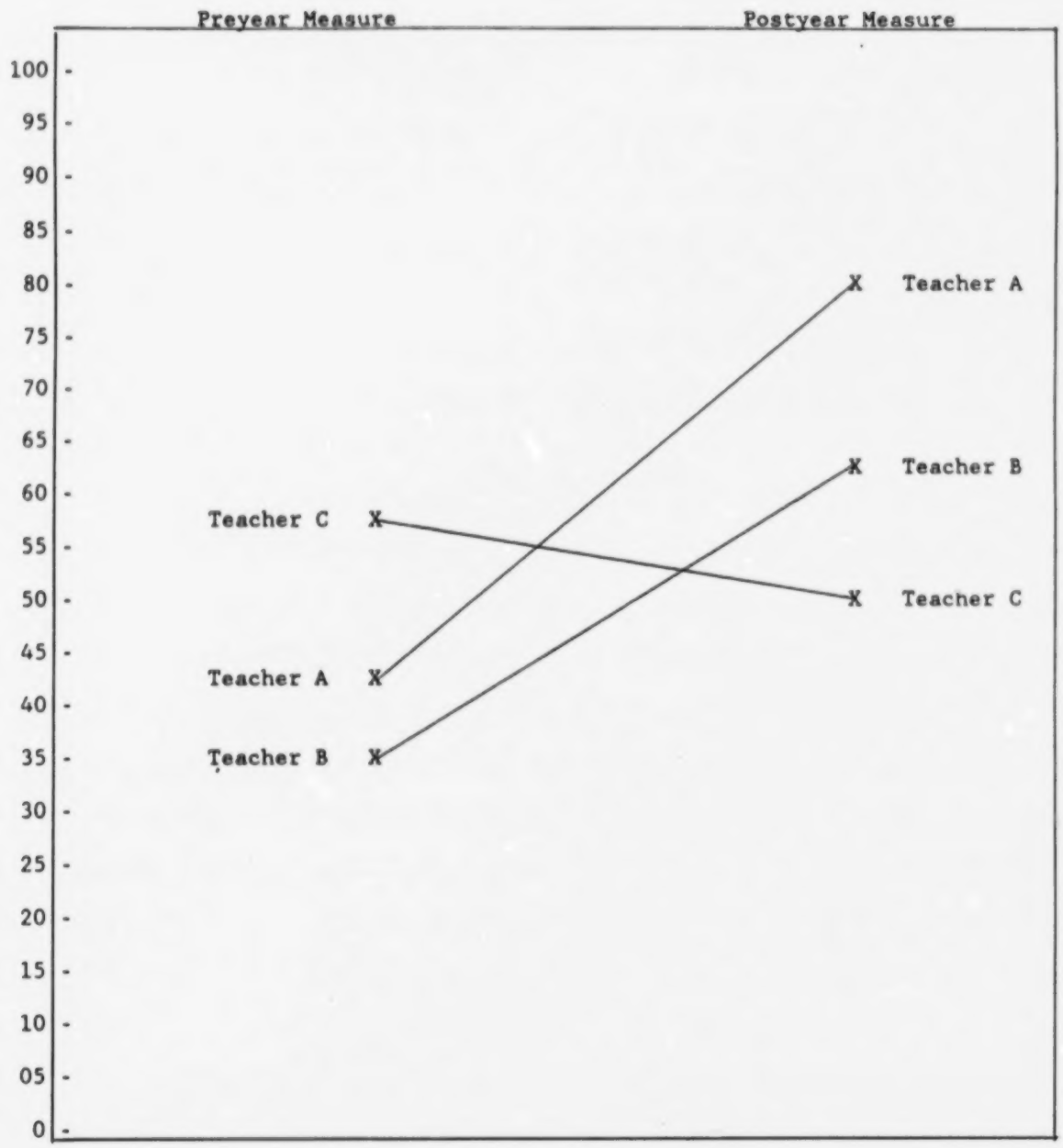

Figure 1. Teachers' instructional understandings, recorded in percentages.

score of zero for the preyear time point and ended with 21% at the postyear time point. Conceptual understandings increased from 13% to 25%, routine skills moved from 6% to 14%, and content knowledge moved from 20% to 21%. Positive responses decreased slightly over the year, moving from 27% to 18%. Teacher A started the year with knowledge that emphasized the development of positive responses and ended the year with a balance for the five outcomes of reading instruction. Teacher A had begun to embrace the instructional complexities of reading instruction by increasing her knowledge about instructional understandings and showing balanced knowledge about the outcomes of reading instruction.

Teacher B initially scored 12 out of 35 (34%) and ended the year with a score of 22 out of 35 (63%), showing a growth of 83% in instructional understandings as shown in Figure 1. Within both time points, the specific outcome measures showed reconfiguration. Strategic processes initially received a score of 0% and ended with a score of 4%, and content knowledge also received an initial score of 0% but moved to a score of 23%. Conceptual understandings changed very little, moving from 25% to 27%. Routine skill dropped slightly from 25% to 23%, and positive responses dropped considerably from 50% to 23%. Teacher B started the year with instructional understandings that emphasized the outcome of positive responses and excluded any reference to strategic processes and content knowledge. By the end of the year, the strategic processes outcome had increased slightly and the content knowledge outcome increased considerably. Teacher B showed growth in the overall measure of instructional understandings, but balanced knowledge about the five outcomes did not occur.

Teacher C showed a decrease in her scores as seen in Figure 1. She began the year with a score of 20 out of 35 (57%), and ended the year with a score of 18 out of 35 (51%), for a decrease of 6%. Within both time points across the year, the submeasures showed little reconfiguration. Strategic processes received a score of 0% for the preyear time point and increased slightly to 2.9% at the postyear time point. Content knowledge increased from 11.4% to 14.3%, while routine skills remained the same at 8.6%. Conceptual understandings decreased from 20% to 14.3%, as did positive responses, decreasing from 17.1% to 11.4%. Teacher C started the year with understandings that primarily emphasized the development of conceptual understandings and positive responses and ended the year with understandings that emphasized positive responses and content knowledge. There was little evidence for understandings about strategic processes. Teacher C did not show evidence of balanced understandings for all outcomes.

Evidence of Change in Teachers' Instructional Actions

The adaptive actions measure for reading lessons was used to examine evidence of change in instruction for the amounts and types of adaptive actions and the degree of metacognitive awareness for each of the three teachers.

Teacher A's growth in adaptive actions is seen in Figure 2. At the preyear time point, her ratings showed that .029 (2.9%) of her instruction was adaptive, increasing to .251 (25.1%) at the end of the year, showing growth of 766%. Teacher A's adaptive actions began with a lesson designed only to develop understandings about content knowledge and routine skill outcomes. The year ended with a lesson emphasizing integrated strategic processes and content knowledge. Teacher A expanded her adaptive actions in instruction from a

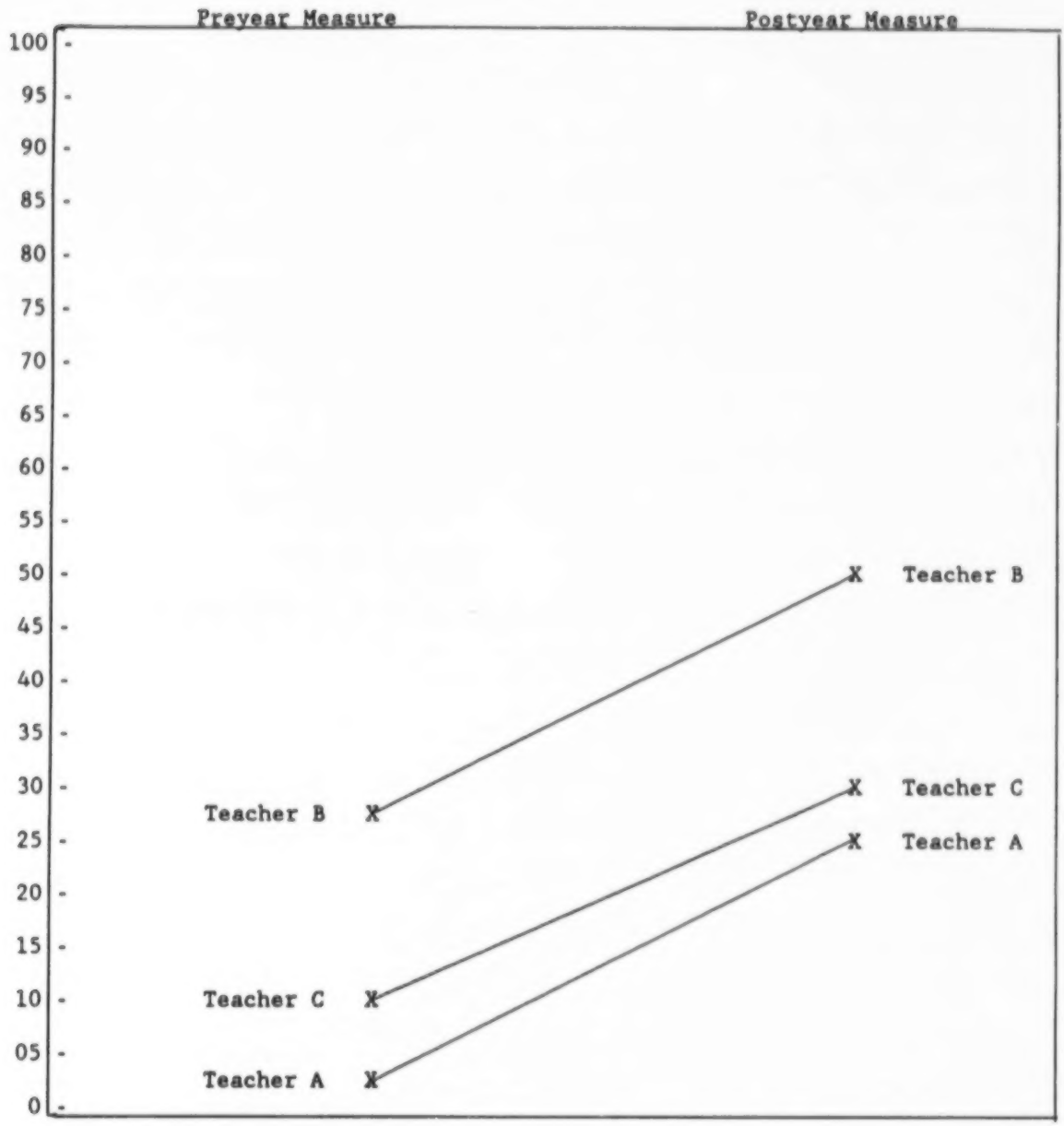

Figure 2. Teachers' instructional actions, recorded in percentages.

lesson on routine skills and content knowledge to a lesson where strategic processes and content knowledge were purposefully integrated.

The preyear ratings for amounts of metacognitive awareness in Teacher A's lesson showed three instances of adaptive actions with a range of ratings from 1 to 3 out of a possible score of 4. At the end of the year, there were seven instances of adaptive actions, with a range of 1 to 3. Three adaptive actions received metacognitive ratings. Teacher A embraced the instructional complexities in terms of amounts and types of adaptive actions and degrees of metacognitive awareness as she ved toward expertise in strategic reading instruction.

Teacher B's adaptive actions in lessons began with a rating of .275 (27.5%) and ended with a rating of .514 (51.4%), showing a growth of 87%. Her adaptive actions began with a lesson designed to develop understandings about content knowledge outcomes and concluded the year with a lesson focusing on the integrated development of understandings about strategic processes and content knowledge.

Teacher B's preyear ratings showed five instances of adaptive actions with scores ranging from ratings of 1 to 3 with a possible score of 4, with one adaptive action receiving a metacognitive rating. At the end of the year, variance in awareness ratings dropped to 1 or 2 for 17 instances of adaptive actions when Teacher B attempted integrated strategic processes and content knowledge lessons. No metacognitive awareness was present. Teacher B attempted to embrace the complexities of instructional actions in terms of the types of lessons and amounts of adaptive actions, but these attempts appeared to be related to a loss of metacognitive awareness developed during lessons.

Teacher C's adaptive actions during lessons began with a rating of .105 (10.5%) and ended with a rating of .305 (30.5%), showing a growth of 191%. Her adaptive actions began with a lesson designed to develop understandings about content knowledge and routine skill outcomes and ended the year with continued development of routine skills and content knowledge outcomes. Teacher C did not expand her adaptive actions in instruction beyond routine skills and content knowledge outcomes.

The beginning of the year ratings for Teacher C's adaptive actions showed six instances with a range of 1 to 3 out of a possible score of 4 with three instances of adaptive actions receiving metacognitive ratings. At the end of the year, there were five adaptive actions with a range of 1 to 2 out of a possible score of 4, with no instances of metacognitive awareness in the lesson. Teacher C increased the amounts of adaptive actions but did not increase the types of adaptive actions. Loss of metacognition occurred across the year. Teacher C did not embrace the complexities of instructional actions.

Evidence of Change in Students' Reading Understandings

The reading understandings interview was used to explore the growth of selected students' knowledge about the reading outcomes in each of the three teachers' classrooms. As seen in Table 1, growth occurred in Teacher A's classroom, but no growth occurred in Teacher B's and C's classrooms. In order to get an accurate growth measure, the pretest score was subtracted from the posttest score resulting in net change. The net change was then divided by the pretest score to give a numerical improvement or decline. Finally, this value was converted to percentages for discussion purposes.

At the preyear time point, Teacher A's first-grade students scored 3.2 and then at the postyear time point scored 6.6 out of a possible score of 25,

Table 1

Student Reading Understandings[a]

	TEACHER A		TEACHER B		TEACHER C	
	Pre[b]	Post	Pre	Post	Pre	Post
Student 1						
SP	0	3	0	1	0	0
CU	0	1	0	0	0	1
PA	0	1	0	0	0	1
CK	0	1	0	1	1	0
RS	2	3	3	2	1	1
Student 2						
SP	0	4	0	0	0	0
CU	0	0	0	0	0	0
PA	0	2	0	0	0	1
CK	0	1	0	0	1	0
RS	3	2	2	2	1	1
Student 3						
SP	0	1	0	0	0	0
CU	0	1	0	0	0	0
PA	0	0	0	0	0	0
CK	0	1	0	0	1	0
RS	3	3	3	2	1	1
Student 4						
SP	0	1	0	0	0	0
CU	0	0	1	1	1	1
PA	0	0	0	0	0	1
CK	0	0	0	0	1	0
RS	5	4	5	3	1	1
Student 5						
SP	0	1	0	2	0	0
CU	0	1	1	1	0	0
PA	0	0	0	0	0	0
CK	0	0	0	0	1	1
RS	3	2	4	4	1	1

[a]SP - strategic processes
CU - conceptual understandings
PA - positive attitude
CK - content knowledge
RS - routine skills
Range is 0 to 5; total possible score for any one student is 25.

[b]"Pre" and "Post" refer to preyear and postyear measures.

showing growth of 106%. Within both time points, specific outcomes were reconfigured. The students' scores at the preyear time point showed no knowledge for the importance of strategic processes which increased over the year to 50%. The positive response, conceptual understandings, and content knowledge outcome scores also started at 0% and increased over the year to 11%, 12%, and 12%. Knowledge of routine skill outcomes decreased slightly across the year from 64% to 56%. These first-grade students had begun to reconfigure their reading understandings, showing more balanced knowledge about all the outcomes of reading.

Teacher B's sixth-grade students initially scored 3.8 out of 25 and then again scored 3.8 out of 25, showing no growth. Within both time points, some reconfiguration occurred. The students' scores at the pretest time point showed no knowledge about strategic processes, and this increased to 12% at the end of the year. For content knowledge, the students increased their understandings slightly, moving from 0% to 4%. For positive responses and conceptual understandings, students did not change their knowledge with scores remaining at 0% and 8%. For routine skills, students' knowledge began with a score of 68% which decreased to 52% at the postyear time point. These sixth-grade students started the year with knowledge about mostly routine skills and began to increase their knowledge in the areas of strategic processes and content knowledge. Knowledge about positive response outcomes did not change at all. A balance of knowledge about all outcomes did not occur.

Teacher C's third-grade students initially scored 2.2 out of 25 and then remained at that score at the postyear time point. Within each time point, some reconfiguration occurred. Students showed no knowledge of strategic processes, and this continued at the postyear time point. Some knowledge

growth occurred for positive response and conceptual understanding with scores moving from 0% to 12% and from 4% to 8%. Content knowledge dropped over the year from 20% to 4%. Knowledge for routine skills remained at 20% across the year. Some reconfiguration occurred, but knowledge about content and conceptual understandings remained low, with strategic processes remaining at 0% for these third-grade students. No balance of knowledge about the outcomes occurred.

Evidence of Change in Students' Metacognitive Awareness

The student awareness interview conducted immediately after observed lessons was used to explore metacognitive awareness of lesson content in terms of declarative, procedural, and conditional knowledge. Growth occurred in all three classrooms across the year. The same conversion procedures that were used with the students' reading understandings were used for this measure.

Teacher A's first-grade students showed an overall average of .33 of a possible score of 4 at the preyear time point (see Table 2). At the postyear time point, students' awareness of lesson content increased to 2.27 out of 4. These first-grade students grew 588% in their awareness of lesson content during the school year with 5 of the 12 instances showing metacognitive awareness.

Teacher B's sixth-grade students had an overall average of .75 out of 4 at the preyear time point, as seen in Table 2. None of the 12 instances showed metacognitive awareness. At the postyear time point, students' awareness of lesson content showed an overall average of 2.8 out of 4. These students grew 273% in their awareness of lesson content during the school year. Two of the 12 instances showed metacognitive awareness.

Table 2

Student Metacognitive Awareness of Lesson Content[a]

	TEACHER A		TEACHER B		TEACHER C	
	Pre[b]	Post	Pre	Post	Pre	Post
Student 1						
declarative	1	2	0	3	1	1
procedural	0	3	2	2	0	2
conditional	1	4	1	2	0	1
Student 2						
declarative	1	2	1	1	1	2
procedural	0	1	0	3	0	2
conditional	0	2	0	2	1	0
Student 3						
declarative	1	2	2	2	2	1
procedural	0	3	1	2	1	2
conditional	0	3	1	2	0	2
Student 4						
declarative	0	1	1	1	2	1
procedural	0	1	0	3	1	2
conditional	0	3	0	2	1	2
Student 5						
declarative	-	-	-	-	2	1
procedural	-	-	-	-	2	2
conditional	-	-	-	-	2	2

[a]Range is 0 to 4; total possible score for any one student is 12. Ratings of 3 and 4 signal metacognitive levels.

[b]"Pre" and "Post" refer to preyear and postyear measures.

Teacher C's third-grade students showed preyear scores of 1.07 out of 4 (see Table 2). At the postyear time point, students' awareness of lesson content was 1.53 out of 4. These third-grade students grew 196% in their awareness of lesson content during the school year. There were no instances of metacognitive awareness at either time point.

When awareness of the submeasures of declarative, procedural, and conditional knowledge were explored, additional patterns of growth were found. Teacher A's students moved from mostly declarative awareness to awareness of all three types of knowledge. For the preyear time point, these students received nonmetacognitive scores that were primarily in the declarative knowledge area. At postyear time point, the students had grown, showing awareness that was at metacognitive levels in all three knowledge areas. Similar to the Teacher Explanation Study (Duffy, Roehler, Meloth, Vavrus, Book, Putnam, & Wesselman, 1988; Duffy et al., 1987), Teacher A's first-grade students showed increases in amounts and types of awareness.

Teacher B's students showed preyear patterns indicating awareness in all three areas; but there were no instances of metacognitive awareness. At the postyear time point, all students showed awareness in declarative, procedural, and conditional knowledge with only two of the students showing metacognitive awareness levels for procedural knowledge.

Teacher C's students also showed preyear patterns indicating awareness in all three knowledge areas. As with Teacher A's and B's students, there were no levels of metacognitive awareness at the preyear time point. At the postyear time point, the pattern changed slightly. All but one of the students showed awareness of declarative, procedural, and conditional knowledge, but none of the students had metacognitive levels for any of the three knowledge areas.

In summary, Teacher A's students increased their awareness of lesson content within all three knowledge areas across the year with metacognitive ratings appearing for three of the four first-grade students. These students seemed to show balanced growth in metacognitive awareness as Teacher A embraced the instructional complexities regarding understandings and actions. Teacher B's students also increased their amounts of awareness, but only two increased their awareness of metacognitive levels within procedural knowledge. These students grew slightly in metacognitive awareness as Teacher B grew in her knowledge of adaptive actions but not in her knowledge of instructional understandings. Teacher C's students increased their awareness slightly, but metacognitive levels were never acquired. Teacher C increased her adaptive actions but, like Teacher B, did not increase her instructional understandings across the year.

Evidence of Change in Students' Strategic Actions

The modified graded oral paragraph technique adapted from Leslie and Caldwell (1989) was used to examine students' growth in strategic actions while reading. This technique measured students' reports about the reasoning used to (a) predict and verify predictions, (b) correct reading errors, and (c) gain understandings about concepts as a result of reading content information in texts. The same conversion procedures for growth were used for this measure. As seen in Table 3, growth occurred for most students across the year. Teacher A's first-grade students averaged a score of 0 out of a possible score of 4 for the preyear measure. For the postyear measure, the students averaged a score of 1.73 out of 4. They increased their strategic actions by 2.2 times their previous level. Growth also occurred in each of the three submeasures. Regarding the reasoning used in predicting before reading, the students

Table 3
Student Strategic Actions[a]

	TEACHER A		TEACHER B		TEACHER C	
	Pre[b]	Post	Pre	Post	Pre	Post
Student 1						
predicting	0	3	0	1	1	1
self-correcting	0	1	1	2	1	1
concepts	0	0	0	1	1	1
Student 2						
predicting	0	1	1	2	1	1
self-correcting	0	1	1	2	0	0
concepts	0	1	1	1	0	1
Student 3						
predicting	0	3	2	2	1	1
self-correcting	0	1	2	2	1	1
concepts	0	3	1	2	0	1
Student 4						
predicting	0	3	1	2	1	2
self-correcting	0	2	1	3	1	1
concepts	0	0	0	1	0	0
Student 5						
predicting	0	3	1	2	1	1
self-correcting	0	1	1	2	1	2
concepts	0	3	0	3	0	0

[a]Range is 0 to 4; total possible score for any one student is 12. Ratings of 3 or 4 signal metacognitive levels.

[b]"Pre" and "Post" refer to preyear and postyear measures.

averaged a score of 0 which grew to 2.6 out of 4. Regarding the reasoning used in self-corrections when reading, the students averaged a score of 0 which grew for the postyear time point to 1.20 out of 4. On the final submeasure of reasoning used when gaining knowledge about concepts from text, the students moved from 0 to 1.4 out of 4. All students increased their knowledge about all areas of strategic actions, with four students receiving metacognitive awareness ratings in at least one of the submeasure areas.

Teacher B's sixth-grade students scored 1.3 out of 4 for the preyear time point. They scored 1.9 out of 4 for the postyear time point, showing growth of 46%. Growth also occurred in each of the three submeasures. Regarding the reasoning used in predictions and verifications of those predictions, the students scored 1.0 out of 4 for the preyear time point which grew to 1.8 out of 4, for a growth of 80%. Regarding the reasoning used in self-corrections when reading, the students scored 1.8 which moved to 2.2 out of 4 at the postyear time point for a growth of 22%. On the final submeasure of reasoning used when gaining knowledge about concepts from text, the students scored 1 which increased to 1.6 out of 4, showing a growth of 60%. All sixth-grade students increased their knowledge about the strategic actions in at least one of the submeasures. Only one student gained in all three submeasures of strategic actions. No students received metacognitive awareness ratings in any of the sub-measure areas.

Teacher C's third-grade students scored .67 of 4 for the preyear time point. They scored .93 out of 4 for the postyear time point, showing a growth of 55%. Growth within each of the three sub-measures varied. Regarding the reasoning used in predictions and verifications of predictions, students scored 1 moving to 1.2 out of 4, showing a growth of 20%. Regarding the reasoning

used in self-corrections when reading, students scored .8 moving to 1 out of 4, showing a growth of 25%. On the final submeasure of the reasoning used when gaining content knowledge about text concepts, students scored .2 out of 4, moving to .6 out of 4 at the postyear time point, showing a growth of 200%. There were no instances of metacognitive awareness in any of the submeasures of strategic actions.

In summary, Teacher A's first-grade students increased the amounts of knowledge about strategic actions within all three submeasures. Four of the five students reached metacognitive awareness levels about strategic actions in at least one of the submeasures. These students showed balanced growth about strategic actions as they grew substantially in their ability to use and explain the three types of reasoning involved in the application of strategic actions as they read. Teacher B's sixth-grade students all increased their knowledge about strategic actions in at least one of the submeasures. Only two of the five students reached metacognitive awareness levels within procedural knowledge as they used strategic actions. Teacher B's students grew slightly in strategic actions. Teacher C's third-grade students increased their strategic actions slightly with four of the five students showing some growth in at least one of the subareas. None of the students reached metacognitive awareness levels about strategic actions.

Evidence of Change in Student Motivation

A student-motivation measure was used to examine amounts of enthusiasm and efficacy for preyear and postyear time points. Little growth occurred across the year as motivation remained high. Students' growth in motivation was converted using the procedures explained for student growth in reading understandings.

In Teacher A's classroom, the students' motivation scores ranged from 102 to 162 out of 175 with an averaged score of 137 at the preyear time point and ranged from 134 to 169 with an averaged score of 152 at the postyear time point, showing an overall growth of 11% in motivation across the year. Within the motivation measure, enthusiasm scores moved from 60 to 63 out of 75 at the postyear time point. Slightly more growth occurred in the efficacy measure. For the preyear measure, students scored 77 and moved to 88 out of 100 for the postyear measure. These students showed high levels of motivation at the beginning of the year and maintained this motivation throughout the year.

In Teacher B's classroom, motivation scores ranged from 93 to 129 out of 175, with an averaged score of 105 at the preyear time point. For the postyear time point, students' scores ranged from 86 to 125 out of 175, with an averaged score of 102, showing a decrease of 2% in motivation across the year. Within the motivation measure, the enthusiasm scores moved from 42 to 44 out of 75 at the postyear time point. Within the efficacy measure, a slight decrease occurred. For efficacy, the students scored 62.8 out of 100 for the preyear measure and then scored 58 for the postyear measure. These students showed moderate levels of motivation at the beginning of the year, and maintained that level throughout the year. Within the motivation measure, students increased slightly in enthusiasm and decreased slightly in efficacy.

In Teacher C's classroom, motivation scores ranged from 111 to 159 out of 175 with an averaged score of 133. For the postyear time point, students' scores ranged from 119 to 166 out of 175, with an averaged score of 139, showing an overall growth of 5% in motivation across the year. Within the motivation measure, the enthusiasm scores moved from 58 to 60 out of 75. The increase in efficacy was slightly lower. At the preyear time point, students

scored 76 of a possible score of 100 which moved to 79 at the postyear time point. These students showed high levels of motivation at the beginning of the year and maintained this motivation throughout the year with a slight increase for enthusiasm and efficiency at the end of the school year.

Evidence of Relationships Between Teacher Understandings and Actions and Student Growth

When the relationships between teacher understandings and actions and student growth in conceptual understandings, strategic actions, lesson-content awareness, and motivation were explored, different patterns emerged for the three teachers and their students.

Teacher A increased her instructional understandings by 86%. Her understandings increased from primarily one outcome to a more balanced understanding about all outcomes. The amounts of her adaptive actions during lessons grew almost 766% over the year. The types of lessons grew from an emphasis on either routine skills or content knowledge to integrated strategic processes and content knowledge. These lessons improved in quality with the early lesson showing only one instance of metacognitive awareness and the postyear lesson showing more instances of metacognitive awareness. At the year's end, Teacher A had embraced the complexities, showing both balanced understandings about all the reading outcomes and increased amounts and types of adaptive actions that reflected metacognitive awareness.

Students showed similar patterns of growth in their reading understandings, awareness of lesson content, strategic actions, and motivation. Students grew in their reading understandings by 106%. Understandings increased from primarily one outcome to a more equitable balance across all outcomes. For awareness of lesson content, these first-grade students showed an increase of

588%. Awareness of lesson content was rated low at the beginning of the year, but increased to metacognitive awareness of mental processes by the postyear time point. Regarding strategic actions while reading, Teacher A's students showed an overall increase. The abilities to predict, correct, and gain conceptual knowledge and explain the reasoning behind each ability all increased within this measure. Finally, this trend continued with motivation in that the students maintained their high levels of motivation, which even grew slightly. As Teacher A embraced instructional complexities, her students moved toward expertise in multiple areas of reading.

Teacher B increased her overall instructional understandings 83%. Within her understandings of the five outcomes, little change occurred. Understandings about content knowledge outcomes increased, concern for positive response and conceptual understandings outcomes decreased, and concerns for strategic processes changed slightly, remaining very low. Teacher B did not achieve a balanced set of understandings about reading outcomes. Second, the amounts of Teacher B's adaptive actions grew 87% over the year. The types of lessons grew from content knowledge outcomes to content knowledge and strategic processes outcomes that were integrated into the same lesson. Metacognitive awareness disappeared when the teacher attempted to increase the complexity by integrating two outcomes. By the end of the year, Teacher B had begun to integrate multiple reading outcomes into her adaptive actions in a lesson, but she did not embrace the instructional complexities associated with instructional understandings and she did not achieve metacognitive awareness for adaptive actions during lessons.

Students showed patterns of change that reflected Teacher B's changes. For reading understandings, no increase occurred. Within the understandings of the

five outcomes, little reconfiguration occurred. The sixth-grade students started and ended the year with understandings mostly about routine skills. Understandings about strategic processes, positive responses, and content knowledge increased slightly. For awareness of lesson content, these sixth-grade students showed an increase of 273%. Two of the students reached metacognitive awareness levels for procedural knowledge by the end of the year. Regarding strategic actions while reading, Teacher B's students also showed an overall increase of 46%. The abilities to predict, correct, and gain conceptual knowledge and explain the reasoning behind each ability all increased within this measure. The students decreased slightly in their motivation scores, increased slightly in enthusiasm, and decreased slightly in efficacy. The students gained in measures that reflected specific lesson growth, but did not gain in measures that reflected yearlong growth.

Teacher C decreased her instructional understandings. Her understandings of the reading outcomes altered little over the year with little evidence of understandings about strategic processes. Second, the amounts of Teacher C's adaptive actions grew 196%. The types of lessons did not change, remaining with content knowledge and routine skills outcomes throughout the year. The beginning lessons had instances of metacognitive awareness which disappeared by the end of year. Teacher C's adaptive actions only increased in amounts but did not increase in types of lessons or instances of metacognition.

Students showed similar patterns of change in their reading understandings, awareness of lesson content, strategic actions, and motivation. Within their reading understandings, the students showed no growth. For each of the outcomes, little reconfiguration occurred. The strategic processes rating remained unchanged at zero. The conceptual understandings and positive

response outcomes increased slightly with a decrease in understandings about content knowledge. For awareness of lesson content, these third-grade students showed an increase of 20%. There were no instances of metacognitive awareness at either time. Regarding strategic actions while reading, Teacher C's students showed an overall increase of 55%. The abilities to predict, correct, and gain conceptual knowledge and explain the reasoning behind each ability all increased within this measure. For motivation, students maintained high ratings across the year, improving slightly by the end of the year in both enthusiasm and efficacy. These students showed growth in actions but not in understandings about reading.

Discussion

This study begins to illustrate the complexities of reading instruction and the connections between teacher thought and action and student growth. When the growth of low-group students in the classrooms of these three teachers was examined, it was evident that the sets of students moved in varying amounts along the path toward literacy. Teacher A's students increased their understandings about reading and showed balanced growth within the types of understandings. They also grew in their abilities to reason and use strategic actions while reading. Lesson awareness for all students increased with that awareness reaching metacognitive levels by the end of the year. Motivation increased slightly with high levels of motivation being maintained across the year. Teacher A's students showed growth in all measures of reading acquisition.

Teacher B's students did not increase their understandings about reading and showed some reconfiguration of understandings about the various outcomes. A balanced set of understandings did not occur. These sixth-grade students

grew considerably in awareness of lesson content but grew very little in strategic actions and decreased in motivation. Teacher B's students showed growth in areas related to instructional actions connected to specific lessons but showed little or no growth in areas connected to longitudinal strategic reading and understandings.

Teacher C's students also did not increase their understandings about reading, showing little reconfiguration of understandings about the various outcomes. A balanced set of understandings did not occur. However, these third-grade students did grow in awareness of lesson content. This growth was reflected to a lesser degree in strategic actions and motivation. Teacher C's students showed growth in areas related to instructional actions, but showed little growth in areas related to instructional understandings.

When the results of the three teachers were examined for evidence that they might be embracing the complexities of reading instruction, some interesting findings emerged. Teacher A appeared to view the outcomes of reading as multiple and complex. While her baseline lesson contained adaptive actions geared only to develop understandings about the outcomes of routine skills and content knowledge, her end-of-year lesson contained adaptive actions geared to develop understandings about the outcomes of integrated strategic processes and content knowledge. In addition, Teacher A's adaptive actions increased in instances of awareness to metacognitive levels.

While Teacher A illustrated both understandings and actions reflecting the complexities of instruction, Teacher B did not. Teacher B appeared to simplify the complexities by focusing on adaptive actions and not on understandings about the outcomes of reading instruction. No balance occurred across the five outcomes. As the year ended, she had increased in terms of amounts and types

of adaptive actions but had not yet reached metacognitive levels for awareness during adaptive actions.

While Teacher B's findings seemed to indicate an initial simplification of the instructional complexities and a later movement toward including more of the complexities, Teacher C did not. She initially simplified the reading instruction complexities which remained at the simplified level throughout the year. Teacher C had reading outcome understandings that were less complex, with routine skills and content knowledge as most important. Her lessons contained adaptive actions geared only to develop routine skills and content knowledge outcomes with no adaptive actions present for strategic reasoning, positive responses, or conceptual understandings. When evidence of instructional understandings about reading was examined, Teacher C showed a slight increase over the year, but her reconfiguration of outcomes did not show a balance across the five outcomes. Understandings about strategic processes was very low.

When end-of-year interviews were examined, further evidence showed that Teacher A was trying to embrace the complexities of reading instruction, Teacher B was initially simplifying the complexities, and Teacher C was simplifying the complexities throughout the year. Teacher A's view is illustrated in the following statement when she responded to the question of her outcomes for reading. She said,

> My goal is to have motivated, self-regulated, strategic readers. Last year, I was so worried about getting the children through the basal. This year I didn't worry about it. When I think back to September, I've really expanded on what I think reading is. It is not just the ability to decode and comprehend; it is for information and for pleasure. I really emphasized decoding and comprehension in the fall, and I still want them to decode and comprehend; but now it's different. I want them to have strategies, and I want them to appreciate reading. Last year, I had them sound words. I never really taught them strategies. Now I do.

Teacher B's view was also illustrated in an end-of-year interview. She said,

> I don't mind trying new things; I just want to take it slow and understand things first. I don't think anything I did this year is that radical or that different. More importantly, I never feel like someone was saying, 'You should do it this way.' When I thought something was successful, I planned to continue it. Then I thought about something else. I moved at my pace.

Teacher C's final interview yielded data that showed that she seemed to view the outcomes of reading in a reductionist way. She said,

> The more I reflect, I begin to wonder if indeed that there isn't a trick of the trade to help a child make sense of what was just read. Just one way to evaluate and understand the parts that make up the whole. I would feel more comfortable with a prescribed list of strategies which I could then monitor and adjust to my style. There are too many things to think about.

It appears that the instructional understandings and actions that teachers have about developing reading may be a productive way to explore problems of classroom implementation of research when the outcomes are as complex as they are in classroom reading instruction.

The results of this study support the need for teachers initially and continually to embrace the complexities of classroom reading instruction, both in terms of their instructional understandings and of their instructional actions. In addition, two other insights emerged. First, classroom instruction that has complex outcomes requires time. Even though Teacher A embraced the complexities and spent most of the school year developing balanced opportunities for all outcomes, she was just beginning to be in control of the instruction as the year ended. It takes time for teachers to understand these complexities and to teach in ways that develop all outcomes. Second, teachers need a broad vision about reading instruction that allows them to more easily and use all the new information as they plan and implement lessons. Teacher A

had a vision about reading instruction that included understandings and actions about all the outcomes that guided her use of the new information as she planned, implemented, and evaluated lessons. Teacher B's view of instruction was one step at a time until new information was understood. And finally, Teacher C's view of instruction was a search for simplification.

As interesting as these findings are, it must be kept in mind that this study only begins to explore the connections between teacher understandings and actions and student outcomes. Many questions remain. Why were Teacher A's understandings and actions more closely related to positive student outcomes? What roles do age and experience play in teacher change? Do students' strategic actions and understandings generalize from reading to other subject matter areas? Studies are currently underway to examine these and other issues.

Even though these findings are tentative and substantiation is needed, they do suggest teacher educators and researchers need to examine the assistance and interventions they provide for teachers. When the desired student outcomes involve complex understandings, strategic actions, high motivation, and awareness of lesson content, it appears that initial simplification or continual simplification that reduces the complexities of the instructional intervention may be detrimental. Simplification tends to lead to the possibility of mind sets that exclude acknowledgment of the complexities for later use and solidifies keeping the process simple. This simplification appears to lead to less student growth toward literacy. It may be that researchers and teacher educators should stop simplifying and reducing the content of reading instruction interventions initially for teachers and,

instead, develop ways to help them embrace and work comfortably with the complexities from the onset of professional development.

Conclusions

Our society is moving from the industrial era, where we needed high numbers of people who could repetitiously complete a task that was an isolated part of a larger product, to the knowledge era, where high numbers of people are needed who can reason through problems in flexible and adaptive ways. These changes bring new instructional complexities to the classrooms which require changes in educational practices which have typically been taught in reductionist ways. What is needed in educational practices is instruction where the collection of the parts is preceded with an explicit vision of the whole. Instruction must begin with a vision of the outcomes which then guides the instruction as desired patterns and pieces of understanding emerge and become integral parts of the vision. Rather than use the instructional approach of initially breaking reading into various strategies for ease of instruction and learning and then combining those strategies with content for later use, this study indicates that it may be better to start with a vision for what the strategies are, how the strategies should be used, when they should be used, and why they should be used while reading worthwhile content. The specific cognitive strategies that support the vision are then taught with worthwhile content as learners gradually gain cognitive and metacognitive control of the strategies (Palinscar & Brown, 1984). Declarative, procedural, situational, and conditional knowledge develops in conscious ways as does the knowledge of how all parts fit into the vision.

It may be that teachers need to create instructional opportunities for student learning that are somewhat like the creation of a tapestry. The weaver

starts with a mental image of the finished product and painstakingly lays the foundations of the patterns that give substance and warp to the tapestry. The weaver carefully follows the patterns, expanding on patterns when needed, adding in new patterns when needed, and dropping patterns when needed. The specific patterns are carefully attended to within the message of the overall tapestry. But as the finished product emerges, it is generally the whole tapestry that is enjoyed, understood, and used. The combined specific patterns become a way for the whole tapestry to be understood. The weaver embraces the complexities of creating a tapestry just as teachers may need to embrace the complexities of reading instruction. It appears that students can be better helped in their movement toward literacy when teachers embrace instructional complexities. Teachers need to start with a vision that includes the development of all five outcomes, and they need to carefully attend to the specific patterns that make up the whole of reading instruction, while always remembering that it is the concept of moving toward literacy that counts.

This type of instruction embraces the complexities of classroom instruction, acknowledges the importance of having a vision from the beginning, builds on the wealth of classroom learning opportunities in cognitively, metacognitively, and motivationally sound ways, and advances the possibilities of learners becoming enthusiastic strategic sense makers when they read. Embracing the complexities becomes the way of instruction.

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